

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1-88. (canceled)

89. (currently amended) A method of forming arrays of oligonucleotides on a solid support comprising:

providing a solid support having an array of positions each suitable for attachment of an oligonucleotide;

attaching linkers to the solid support surfaces ~~or linkers~~, wherein the linkers are suitable for coupling oligonucleotides to the solid support, at each of the array positions; and

forming an array of a plurality of capture oligonucleotides on the solid support by a series of cycles, carried out repeatedly at each array position, of activating selected array positions for attachment of multimer nucleotides and attaching multimer nucleotides at activated array positions, wherein the multimer nucleotides are selected for attachment so that the capture oligonucleotides formed on the array hybridize with complementary oligonucleotide target sequences under uniform hybridization conditions, wherein the multimer is formed from multiple nucleotides linked together.

90. (previously presented) The method according to claim 89, wherein said forming comprises:

applying a multimer nucleotide along parallel rows of the solid support;

turning the support 90 degrees;

attaching a multimer nucleotide along parallel rows of the solid support to form oligonucleotides at row intersections having 2 sets of multimer nucleotides; and

repeating said applying, turning, and attaching until the oligonucleotides at the row intersections have 6 sets of multimer nucleotides.

91. (previously presented) The method according to claim 89, wherein the solid support is made from a material selected from the group consisting of plastic, ceramic, metal, resin, gel, glass, silicon, and composites thereof.

92. (previously presented) The method according to claim 89, wherein the solid support is in a form selected from the group consisting of slides, discs, membranes, films, and composites thereof.

93. (currently amended) The method according to claim 89, wherein the solid support has an array of positions with the ~~plurality of~~ capture oligonucleotides at different positions having different nucleotide sequences.

94. (previously presented) The method according to claim 93, wherein the solid support has wells, raised regions, or etched trenches.

95. (previously presented) The method according to claim 94, wherein the solid support is in the form of a microtiter plate.

96. (previously presented) The method according to claim 89, wherein said attaching a linker comprises:
silanizing a surface of the solid support.

97. (previously presented) The method according to claim 89, wherein the solid support is functionalized with olefin, amino, hydroxyl, silanol, aldehyde, keto, halo, acyl halide, or carboxyl groups.

98. (previously presented) The method according to claim 97, wherein the solid support is functionalized with an amino group by reaction with an amine compound selected from the group consisting of 3-aminopropyl triethoxysilane, 3-aminopropylmethyldiethoxysilane, 3-aminopropyl dimethylethoxysilane, 3-aminopropyl trimethoxysilane, N-(2-aminoethyl)-3-aminopropylmethyl dimethoxysilane, N-(2-aminoethyl-3-aminopropyl) trimethoxysilane, aminophenyl trimethoxysilane, 4-

aminobutyldimethyl methoxysilane, 4-aminobutyl triethoxysilane, aminoethylaminomethylphenethyl trimethoxysilane, and mixtures thereof.

99. (previously presented) The method according to claim 97, wherein the solid support is functionalized with an olefin-containing silane.

100. (previously presented) The method according to claim 99, wherein the olefin-containing silane is selected from the group consisting of 3-(trimethoxysilyl)propyl methacrylate, *N*-[3-(trimethoxysilyl)propyl]-*N'*-(4-vinylbenzyl)ethylenediamine, triethoxyvinylsilane, triethylvinylsilane, vinyltrichlorosilane, vinyltrimethoxysilane, vinyltrimethylsilane, and mixtures thereof.

101. (previously presented) The method according to claim 99, wherein the silanized support is polymerized with an olefin containing monomer.

102. (previously presented) The method according to claim 101, wherein the olefin-containing monomer contains a functional group.

103. (previously presented) The method according to claim 102, wherein the olefin-containing monomer is selected from the group consisting of acrylic acid, methacrylic acid, vinylacetic acid, 4-vinylbenzoic acid, itaconic acid, allyl amine, allylethylamine, 4-aminostyrene, 2-aminoethyl methacrylate, acryloyl chloride, methacryloyl chloride, chlorostyrene, dichlorostyrene, 4-hydroxystyrene, hydroxymethylstyrene, vinylbenzyl alcohol, allyl alcohol, 2-hydroxyethyl methacrylate, poly(ethylene glycol) methacrylate, and mixtures thereof.

104. (previously presented) The method according to claim 101, wherein the support is polymerized with a monomer selected from the group consisting of acrylic acid, acrylamide, methacrylic acid, vinylacetic acid, 4-vinylbenzoic acid, itaconic acid, allyl amine, allylethylamine, 4-aminostyrene, 2-aminoethyl methacrylate, acryloyl chloride, methacryloyl chloride, chlorostyrene, dichlorostyrene, 4-hydroxystyrene, hydroxymethyl styrene, vinylbenzyl alcohol, allyl alcohol, 2-hydroxyethyl methacrylate, poly(ethylene glycol) methacrylate, and mixtures thereof, together with a monomer selected from the group

consisting of acrylic acid, methacrylic acid, vinylacetic acid, 4-vinylbenzoic acid, itaconic acid, allyl amine, allylethylamine, 4-aminostyrene, 2-aminoethyl methacrylate, acryloyl chloride, methacryloyl chloride, chlorostyrene, dichlorostyrene, 4-hydroxystyrene, hydroxymethyl styrene, vinylbenzyl alcohol, allyl alcohol, 2-hydroxyethyl methacrylate, poly(ethylene glycol) methacrylate, methyl acrylate, methyl methacrylate, ethyl acrylate, ethyl methacrylate, styrene, 1-vinylimidazole, 2-vinylpyridine, 4-vinylpyridine, divinylbenzene, ethylene glycol dimethacrylate, *N,N'*-methylenediacrylamide, *N,N'*-phenylenediacrylamide, 3,5-bis(acryloylamido) benzoic acid, pentaerythritol triacrylate, trimethylolpropane trimethacrylate, pentaerythritol tetraacrylate, trimethylolpropane ethoxylate (14/3 EO/OH) triacrylate, trimethylolpropane ethoxylate (7/3 EO/OH) triacrylate, trimethylolpropane propoxylate (1 PO/OH) triacrylate, trimethylolpropane propoxylate (2 PO/OH) triacrylate, and mixtures thereof.

105. (previously presented) The method according to claim 99, wherein said forming comprises:

photolithographically masking the solid support;
photochemically deprotecting the linker or outermost nucleotides attached to the solid support at unmasked array positions; and
adding nucleotides with a photoactivatable protecting group at photochemically deprotected array positions.

106. (previously presented) The method according to claim 105, wherein the photoactivatable protecting group is selected from the group consisting of nitroveratryloxycarbonyl, o-nitrobenzyloxycarbonyl, fluorenylmethoxycarbonyl, dimethyl-dimethoxybenzyloxycarbonyl, oxymethylenanthraquinone, and mixtures thereof.

107. (previously presented) The method according to claim 105, wherein the protecting group protects the nucleotides at their 3' or 5' ends.

108. (previously presented) The method according to claim 105 further comprising:

washing the solid support after said photochemically deprotecting and said adding.

109. (previously presented) The method according to claim 89, wherein the surface ~~or linker~~ is non-hydrolyzable.

110. (previously presented) The method according to claim 89, wherein the solid support has an array of positions with the plurality of capture oligonucleotides having the same nucleotide sequences.

111. (currently amended) The method according to claim 93, wherein each capture oligonucleotide differs from its adjacent capture oligonucleotide on the array by at least 25% of ~~the~~ its nucleotides, when aligned to each other.

112. (previously presented) The method according to claim 93, wherein each capture oligonucleotide is separated from adjacent capture oligonucleotides by barrier oligonucleotides which are shorter than the capture oligonucleotides.

113-147 (canceled)

148. (new) The method according to claim 89, wherein the capture oligonucleotides each have greater than sixteen nucleotides.